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**ABSTRACT**

A method and apparatus for providing a shaped ion beam having low current density and sharp edges. The low current density and sharp edges eliminate the problem of overmilling, while permitting rapid ion beam processing. One method of producing the shaped beam is by using a two lens system, the first lens imaging the source onto the plane of the second lens and the second lens forming an image of the aperture onto the target plane. Another method is to greatly underfocus a chromatic aberration limited beam. Large beams having uniform current density and sharp edges can be produced. A knife edge beam, having a sharp edge can also be produced.

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